

**SAN FRANCISCO MARITIME NATIONAL HISTORIC PARK  
AT HYDE STREET PIER**

**GANGWAY INVESTIGATION**



**Prepared For:**

**NATIONAL PARK SERVICE  
San Francisco Maritime National Historic Park**

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**SAN FRANCISCO MARITIME NATIONAL HISTORIC PARK  
HYDE STREET PIER - GANGWAY STUDY**

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## 1. INTRODUCTION

The San Francisco Maritime National Historic Park, operated by the National Park Service, maintains a collection of historic ships at Hyde Street Pier on the western end of San Francisco's Fisherman's Wharf area. Six historic ships, spanning a century of working history, are berthed at the pier for public display as part of a historic maritime museum. A number of smaller vessels also berth at the pier. Five of the historic ships are open and accessible to the public, one on a limited basis. None of these ships has access designed to comply with the Americans with Disabilities Act (ADA). The location of each historic vessel berthed at Hyde Street Pier is shown on Figure No. 1.1.

The purpose of this study was to examine the overall state of vessel access and to develop conceptual alternatives and costs to improve access where necessary. A primary component of this work was to provide ADA access to two specific ships (Eureka and Balclutha) and to a maintenance float. All elevations in this report are referenced to Mean Lower Low Water (MLLW). ADA access, based on Port of San Francisco guidelines is to be provided between a Mean Accessible Low Water (MALW) elevation of -0.9 ft. and a Mean Accessible High Water (MAHW) elevation of +6.3 ft. All gangways, including ADA gangways, are to accommodate the full tide range of Lowest Observed Tide of -2.5 ft. to Highest Observed Tide of 8.5 ft.

## 2. BACKGROUND INFORMATION

### 2.1 CURRENT STATUS OF FACILITY

Hyde Street Pier is open to the public daily. The historic ships on display, along with their characteristics, are listed below. The location of each vessel at the pier is shown in Figure No. 1.1.

Vessel	Length (Ft)	Beam (Ft)	Draft (Ft)	Displacement (Tons)	Description
Alma	80	23	3.16	42	Bulk Cargo Scow
Balclutha	256	39	13	1,689	Square-Rigged Vessel
Eppleton Hall	101	38	10	166	Paddle Tug
Eureka	300	78	8.3	2,564	Sidewheel Ferry
Hercules	135	26	14	414	Steam Tug
C.A. Thayer	156	36	12	452	Lumber Schooner

Vessels open to the public are accessed by various ramps from the main pier that lead to gangways onto the vessels. Hyde Street Pier is a timber structure that, in the vicinity of the ships, consists of a main pier at elevation +11.7 ft., a lower pier section for access to the C.A. Thayer at elevation +9.7 ft., a raised ramp area for access to the Eureka at elevation +15.7 ft., and a section for access to the Hercules at elevation +9.2 ft. All other vessels are accessed from gangways on

the main pier. The Alma sails occasionally and is accessed via a gangway from the main pier to the Wheat Float to which the Alma is moored. The Eppleton Hall is not accessible to the public.

The various methods of access to the vessels have been developed at separate times, as needed, to suit each individual vessel. Over time, difficulties have been encountered with many of these accesses. Many of the gangways are in need of repair or redesign given the saltwater environment and the relative lack of protection from the predominant waves from the west (from the Golden Gate). The current status and primary concerns investigated regarding access are summarized below.

**MAINTENANCE FLOAT** - The maintenance float is used for access to small boats used for routine maintenance on the pier and vessels. Float access is provided by an old narrow 15-foot long gangway along the eastern side of Hyde Street Pier just south of the Eureka as shown on Figure No. 1-1. The float is an old 18-foot long by 35-foot wide concrete float. The gangway has limited load capacity and does not satisfy ADA access guidelines. A view of the gangway and maintenance float is shown in Photograph No. 1. Perhaps adequate for current needs, the float has a list as can be seen in the photograph. The intent of this study was to identify a more suitable location for the float access and to have the access satisfy ADA criteria. It is preferable to keep the float in the same general location.

**EUREKA GANGWAY** - The Eureka is moored at a simulated ferry ramp. The ramp is sloped from the main Hyde Street Pier as shown on Photograph No. 2. The top of the ramp is four feet above the main deck. It appears that the ramp was constructed to allow access at higher tides. However, with the present system, access at the highest tides is not possible. At very high tides the gangway rests on a roller at the stern of the Eureka that forces the gangway into a very steep angle. The transition plate, at these steep angles, hangs vertically because it is not long enough to rest on the deck. Photograph No. 3 shows the ramp at a high tide with the vessel still accessible. It is possible to visualize the transition plate hanging vertically at even higher tides. Due to the severe slopes, and other features, the gangway does not satisfy ADA criteria.

Vehicles are moved on and off the Eureka using two separate beams that are aligned with the tires on each side of the vehicle. The vehicles are pushed on and off. A more direct method of moving vehicles on and off the vessel is preferred.

**EPPLETON HALL MOORING AND GANGWAY** - The Eppleton is moored on the south side of the pier between the Balclutha and the C. A. Thayer. The vessel is too unstable to board with its exposure to waves on the western side of the pier. No public access has therefore been provided. A view of the Eppleton Hall at its current location is shown on Photograph No. 4.

**THAYER GANGWAY** - The C. A. Thayer, moored on the south side of Hyde Street Pier, is access from a permanent deck depressed two feet from the main



deck level. This lower deck level was constructed to accommodate access to the Thayer at low tides. The gangway is a six-foot wide by 36-foot long steel structure with a turntable on the vessel and roller on the pier deck. Photograph Nos. 5 and 6 show the gangway landing on the deck and turntable on the vessel respectively. The vessel is rotated on a regular schedule so that the turntable can be attached to both the port and starboard sides. The turntable has a plate on wheel design that is not providing satisfactory service.

HERCULES - An extension to the main deck of Hyde Street Pier was constructed to provide access to a float along the northern side of the pier. This extension was used to access and provide mooring points for the Hercules. An aluminum platform has been supported on this deck extension. A brow ramp from the platform to the vessel provides access. This arrangement is shown on Photograph Nos. 7 and 8. The landing of the brow ramp is too small, and the length of the brow is too short given the seven-foot thwartship excursion of the vessel. The brow ramp has fallen off the platform on the stern at low tides. Also, the Hercules is not accessible at high tides because the brow ramp is too low for the brow platform. Safety of access to the Hercules has also been of concern. There have been instances where visitors have fallen, and where young children have stood between the gangway and the side of the landing on the stern putting the children in some danger.

BALCLUTHA - The Balclutha is accessed from the main pier by a 4 foot wide by 35-foot long steel gangway. The vessel is moored along the south side of the pier from 5 to 17 feet from the face of the pier. Due to vessel thwartship excursion, the gangway can completely block access along the pier. A steel plate has been placed across the pier as a bearing plate for the gangway as shown on Photograph No. 9. The roller assembly for the gangway support on the pier is shown on Photograph No. 10. The turntable on the vessel is a flat plate with plastic plate/bushing design. The turntable works satisfactorily. A separate ramp on the vessel provides access from the turntable to deck as shown on Photograph No. 11.

ALMA - The Alma, located at the eastern end of Hyde Street Pier, is accessed via a gangway from the pier to the Wheat Float, and a short platform from the Wheat Float onto the vessel. This access is shown on Photograph No. 12. The gangway support on the pier has deteriorated and the gangway is old and in need of replacement. Photograph No. 13 shows the gangway at the main pier location. The access does not meet ADA criteria.

### **3. SCOPE OF STUDY**

The scope of this study was to determine the specific requirements and propose solutions to the gangway needs at Hyde Street Pier. The following descriptions regarding deficiencies at the pier were to be addressed in this study.

MAINTENANCE FLOAT - Provide a new gangway and concrete float to the maintenance boats located along the eastern side of Hyde Street Pier and south of the Eureka.

'EUREKA' GANGWAY - Provide a new gangway to the 'Eureka.' The existing gangway has very severe angles at high and low tides. The current gangway is for personnel only. The new gangway should be designed to allow access for historic vehicles onto the 'Eureka.'

'EPPIE' MOORING AND GANGWAY - Provide facilities to moor the Eppleton Hall along the eastern side of the 'Eureka.' Access is to be provided from a gangway on the 'Eureka.'

'THAYER GANGWAY' - Provide a new gangway to the 'Thayer', including a new turntable. The gangway must be able to attach to both the port and starboard sides of the vessel. The gangway is not required to meet ADA criteria.

'HERCULES' - Design a new brow ramp system that will accommodate the full tide range experienced at the pier. The ramp system is not required to meet ADA criteria.

'BALCLUTHA' GANGWAY - Provide a new gangway to the 'Balclutha'. The current gangway is very heavy and therefore difficult to move during storm conditions. The new gangway is to be design to meet ADA criteria.

#### 4. GANGWAY CRITERIA

##### 4.1 TIDE RANGE

All gangways shall be designed to function throughout the range from Lowest Observed Tide to Highest Observed Tide.

- Lowest Observed Tide: 2.5 Feet (MLLW)
- Highest Observed Tide: +8.5 Feet (MLLW)

Gangways designed to accommodate the Americans with Disabilities Act (ADA), shall use the tide range defined by the Port of San Francisco 'Guidelines for Access Design of Floating Structures in San Francisco Bay.'

- Mean Accessible Low Water (MALW): -0.9 Feet (MLLW)
- Mean Accessible High Water (MAHW): +6.3 Feet (MLLW)

##### 4.2 ADA CRITERIA

The ADA access design requirements were based on the following documents.

- California Accessibility Statues (May 1994)
- Port of San Francisco: 'Guidelines for Access Design of Floating Structures in San Francisco Bay.'

The primary parameters from these documents related to the Hyde Street Pier gangways are described below.

- Gangway Slope: 1:12 with maximum horizontal distance of 30 feet  
1:16 with maximum horizontal distance of 90 feet
- Gangway Width: 44 inches minimum
- Gangway Guardrail Height: 34 to 38 inches
- Gangway Landings: 60 inches, except 72 inches at bottom landing

ADA access is to be provided for the following vessels.

- Eureka
- Balclutha
- Maintenance Float

#### 4.3 VESSEL PARTICULARS

VESSEL	FREEBOARD (FT)	EXCURSION (TOTAL)	
		FORE/AFT (FT)	THWARTSHIP (FT)
Eureka	9.0	8.75	3.0
C. A. Thayer	10.75	10.0	8.0
Balclutha	14.5	14.0	12.0
Eppleton Hall	9.0 (Bow)	N/A	N/A
Hercules	3.5	7.0	7.0
Maintenance Float	1.5	N/A	N/A
Hercules	4.4	7.0	7.0

#### 4.4 GANGWAY LIVE LOAD CRITERIA

Pedestrian Gangways: Uniform load of 50-lbs./sq. ft.  
 Eureka Vehicle Gangway: Uniform load of 100-lbs./sq. ft.  
 Point load of 400-lbs.  
 Vehicle load of heaviest historic vehicle currently at the  
 SFMNP: 1934 Ford Coal Truck, 3 tons, 80 in. wide

### 5. REHABILITATION ALTERNATIVES

#### 5.1 MAINTENANCE FLOAT

##### Alternative 1 - 60 Foot Gangway, Ramp of Float

Because the maintenance float will have a rather low freeboard of 1 to 2 feet, there is a large vertical height distance between the main deck of the pier and the float. Using a freeboard of 1.5 feet would result in a height of 10.2 feet (11.7-1.5). Figure No. 5.1 illustrates a method to provide ADA compliant access to the float. Because of the low freeboard of the float, the float end of the gangway must be elevated using a ramp on the float. The height of the ramp above the float, shown as 5 feet on Figure No. 5.1, will depend on the float freeboard. This ramp will require a fairly substantial float (a 20-ft. x 50-ft. float is shown on Figure No. 5.1) to remain stable and to provide the space required for access to maintenance

vessels. Four guide piles will be used to maintain the float on location. This alternative has the following advantages and disadvantages.

Advantages:

- Meets POSF guidelines
- Simple operation

Disadvantages:

- Large barge/float for ramp on float (although this provides more mooring capability than a smaller float)

## 5.2 EUREKA

The Eureka with a freeboard of 9 feet has a deck elevation, which varies between +8.1 feet (9.0-0.9) and +15.3 feet (9.0+6.3) for a total accessible range of 7.2 feet. The access system must accommodate this tide range as well as a fore/aft excursion of 9 feet and a thwartship excursion of 3 feet. Additionally, the deck elevation will vary between +6.5 feet (9.0-2.5) and 17.5 feet (9.0+8.5) between the lowest and highest observed tides. The access system must function throughout this tide range, but does not need to comply with ADA requirements beyond the accessible tide. The Eureka deck elevation midway between the accessible tides is at +11.7 feet.

### Alternative 1 - Single 60 Foot Gangway (Figure No. 5.2)

This alternative uses a single, 60-foot long gangway that attaches to the stern of the Eureka. The pier side of the gangway will be set at the elevation of the Eureka deck at mid tide level, which is +11.7 feet, the same as the main deck elevation. This allows a single gangway at a 1:16 slope to meet accessible high and low tides. At a 1:16 slope, the gangway will provide ADA access to deck elevations between +7.95 feet and +15.45 feet, a slightly wider range than required by POSF. The structural portion of the gangway will be steel or aluminum, using a connection directly to the stern. Rollers on the pier side will allow vessel excursion, and counter weights may be used if required by the weight of the gangway (note: this is similar to the historic operation of the Eureka as a ferry). The center 12 feet of the 22-foot wide ramp leading to the Eureka must be reframed to provide space for the new gangway. This alternative has the following advantages and disadvantages.

Advantages:

- Simple design and operation
- Same ramp used for pedestrians and cars

Disadvantages:

- Requires cutting into existing pier

- Will likely be quite heavy, may require counter weight
- Difficult connection to stern

#### Alternative 2 - Double Gangway Pier Modification (Figure No. 5.3)

Two 30-foot long gangways would provide access to the Eureka. The wider gangway would be used for pedestrians at higher tides and for historic vehicles. As the tide lowers, this ramp will become steeper than 1:12, at which point the low water gangway would be used for ADA access. This would require signage to direct persons needing disabled access to the proper ramp. This alternative has the following advantages and disadvantages.

##### Advantages:

- Shorter/Lighter gangways than Alternative 1
- Some amount of redundancy with two gangways

##### Disadvantages:

- Requires signing to indicate which gangway to use
- Complex design

#### Alternative 3 - Double Gangway (Figure No. 5.4)

Two gangways provide access to the Eureka; one that will provide ADA access at higher tides and another at lower tides. The wider gangway would be used for pedestrians at higher tides and historic vehicles, and the narrower gangway would be used at lower tides by persons needing disabled access. This system of gangways will provide ADA access throughout the accessible tide range provided landings are constructed on the deck of the Eureka. An elevated landing is required for the lower tides because the Eureka deck is too low for a 2.5-foot drop possible with a 30-foot long gangway at a 1:12 slope. The landing must be elevated 5.1 feet above the deck. At the higher tides the 5.1-foot high landing is too high. In fact no elevated platform is required. However, some distance is necessary between the deck and landing platform so that the gangway does not strike the edge of the Eureka deck. A landing height of two feet is shown on Figure No. 5.4. The final height will be determined by the gangway framing depth and the location of the landing on the deck. Because the low water landing is elevated, a ramp system down to the Eureka deck will be required. This alternative has the following advantages and disadvantages.

##### Advantages:

- Shorter/lighter gangways compared to single 60 foot gangway
- Some amount of redundancy with two gangways
- Simple gangway design

#### Disadvantages:

- Requires extensive ramps on vessel to meet gangway elevation
- Requires signing that adjusts to tide level changes indicating which gangway to use for ADA access

### 5.3 EPPLETON HALL

It is proposed by the SFMNHP to relocate the Eppleton Hall to the west side of the Eureka to decrease the motions experienced by the vessel (Figure No. 5.5). Access to that location cannot be achieved within the existing leased area of Hyde Street Pier without removing the north east dolphin of the Eureka. A future dock system, being designed for the San Francisco Fisherman's Commercial Fishing Marina, includes a debris boom in the water that will be placed along the east boundary of the Hyde Street lease. This boom will have to be temporarily opened to allow the Eppleton Hall access to the mooring site.

The mooring arrangement for the Eppleton Hall is important in order to limit the relative movement with the Eureka. The vessel will be on a north-south alignment and can be moored with either the port or starboard side toward the Eureka. A new dolphin will be required as shown in Figure No. 5.5. It is suggested that the Eppleton Hall be moored directly to the Eureka in order to limit the differential excursion and movement between the two vessels. Mooring the two vessels together would be particularly advantageous to accommodate the tide fluctuations. Backup mooring lines to the main pier and the existing dolphin as shown in Figure No. 5.5 are also recommended. Mooring points for this arrangement will need to be confirmed during final design.

Access to the Eppleton Hall can be achieved by a brow from the deck of the Eureka onto the Eppleton Hall. The Eureka and the Eppleton Hall have similar freeboards of 9.0 feet. The 9.0 freeboard on the Eppleton Hall is measured from the top of the bulwark. A platform will therefore be required on the Eppleton Hall to receive the gangway and to provide access down to the deck. This will not be an ADA access.

### 5.4 C.A.THAYER GANGWAY

The C.A. Thayer will not be ADA accessible. The turntable at the top of the gangway uses plates and wheels to allow rotational movement. This has not proved to work as well as a sheet of ultra-high molecular weight polyethylene (UHMW-PE) sandwiched between plates, as is used on the Balclutha. The Thayer gangway will be fitted with a new turntable similar to the Balclutha. The present steel gangway is functional; however, a newer aluminum structure would be easier to maintain and use.

### 5.5 HERCULES

A number of changes are required to make access to the Hercules possible over a wider tide range and to make it safer. The access consists of three primary



components: (1) platform on the timber approach, (2) gangway, and (3) landing on the vessel. Access to the Hercules is not required to meet ADA criteria. To accommodate higher tides, a higher platform will be required on the timber deck. Assuming a high tide at +8.5 feet, a freeboard of 3.6 feet at the stern where a gangway would occur, and a landing 2.75 feet above the vessel deck to provide a landing above the bulwark results in a platform elevation of 14.85 feet. Allowing 9 inches for gangway framing gives a platform elevation of 16.6 feet, which is 7.4 feet above the timber deck. This would require eleven steps on the platform. Lowering the high tide for which access is required will drop the platform a corresponding amount. For example, using the MAHW of +6.3 feet rather than +8.5 feet as the maximum tide for which access lowers the height required by 2.2 feet (8.5-6.3) and therefore requires a platform height of 14.4 feet (16.6-2.2). It is important to have each of the steps (riser and run) be identical on the platform for safe use. It is interesting to note that the highest tide at which the Hercules gangway will operate now is approximately +4.4 feet. The current gangway is 14 feet long. This length is too short for the lower tides, particularly if the platform is raised as discussed above. A gangway length of approximately 18 feet would be required with a platform elevation of +16.6 feet and the vessel at the Lowest Observed Tide of -2.5 feet. The gangway design should incorporate features which will not catch and which will slide smoothly on the vessel landing.

The present landing is approximately 5.5 ft. wide by 12.3 feet long including stairs to the deck. This is too small to accommodate to the thwartship and fore/aft vessel excursion. The inside dimension on the vessel landing is 56 inches. The present gangway is 35 inches. This leaves 21 inches maximum or 10½ inches each side if the gangway is centered on the platform, for fore/aft excursion. Allowing for 6 feet of excursion ( $\pm 3$  feet) would require a total platform width of 10 feet. Similarly, to provide adequate length on the vessel landing for the gangway at high tide will require a landing length of approximately 16 feet including the stairs to the deck. This means that the last riser would cover the steering rod cover as shown in Figure No. 5.6. The landing structure should be provided with scaffold jacks so that the framing can be adjusted for trim, list, and deck slope.

The connection between the gangway and platform on the pier must be designed to accommodate fore/aft vessel excursion, similar to a turntable on a standard ship gangway. Also, the space on the vessel landing between the gangway sides and the edge of the landing must be blocked to prevent access, particularly for children. Other details, such as the method for raising and lowering the gangway, must be developed during final design.

## 5.6 ALMA

The Alma float will not be ADA accessible. The existing gangway and connection to the pier have significant deterioration. The gangway is to be replaced with a new aluminum gangway and the timber connection to which the gangway is attached should be repaired.



## 5.7 BALCLUTHA

The Balclutha has two important characteristics, freeboard and vessel excursion, that have a significant effect on providing ADA access. With a freeboard of 14.5 feet, ADA access must be provided when the gangway on the ship is between +13.6 ft. (14.5-0.9) and +20.8 (14.5+6.3) for the total range of 7.2 feet. Locating the gangway on the pier side at the midpoint of this range, at +17.2 ft., will allow access using ADA slope criteria. All three alternatives use a ramp system on the existing pier to reach the +17.2 ft. elevation.

The large excursions experienced by the Balclutha make the gangway supports on the pier awkward and difficult to construct. Limiting this excursion would provide a significant benefit by simplifying the gangway support. The Balclutha is currently moored away from the pier by a combination of various line types. The use of a new fendering system or dolphins, together with a new mooring line pattern would help to limit both excursions in the fore/aft direction and the thwartship direction. Limiting the excursion would permit the type of access shown in the following three alternatives.

This alternative uses a 60 foot long gangway at 1:16 maximum slope for access through the full accessible tide range ( $17.2 \pm 3.75 = 13.45$  to 20.95). Also included with this alternative is a new fendering system along the pier. This combined with a new mooring arrangement would help to limit vessel excursion as discussed above.

### Alternative 1 - Single 60 Ft. Gangway with Fender Piles (Figure No. 5.7)

This alternative has the following advantages and disadvantages.

#### Advantages:

- Simple design and operation
- Fender pile limits lateral ship movement toward pier

#### Disadvantages:

- Fendering system applies load to hull compared to current mooring arrangement
- Ship closer to pier may limit aesthetic view of overall vessel
- Heavy gangway will require more support from vessel

### Alternative 2 - Single 60 Ft. Gangway (Figure No. 5.8)

This alternative is identical to Alternative 1 except that the vessel is moored away from the pier using new dolphins. Bumpers on the dolphins would need to be designed to accommodate the allowable hull loading on the Balclutha.

Advantages:

- Simple design and operation
- Dolphin limits the lateral ship movement and resultant gangway blockage on pier
- Provide better view of ship compared to Alternative 1

Disadvantages:

- Heavy gangway will require more support on vessel.
- Dolphins will concentrate load on hull

Alternative 3 - Double Gangway with Dolphins

This alternative uses two 30-foot gangways rather than the one 60-foot gangway used in Alternatives 1 and 2. The ramp constructed on the pier will have two landings: one for a lower water gangway and one for a higher water gangway. The lower water gangway would provide ADA access from -0.9 (MALW) to 1.3 ft tide; the higher water gangway from tides of 1.3 ft to 6.2 (MAHW). Signage will be required to direct persons needing disabled access to the proper ramp. Dolphins will be installed as in the alternative above to limit vessel and therefore gangway excursion. This alternative has the following advantages and disadvantages.

Advantages:

- Lighter gangway and load on vessel
- Dolphin limits lateral ship movement and resultant gangway blockage on pier
- Some amount of redundancy with two gangways
- Provides better view of ship than Alternative 1

Disadvantages:

- Requires larger landing on vessel
- Requires signing to indicate which gangway to use at which time
- Dolphins may concentrate load on hull

**6. ESTIMATED CONSTRUCTION COSTS**

Maintenance Float  
Eureka Gangway  
Eppie Mooring and Gangway  
Thayer Gangway  
Hercules Ramp  
Alma

## **7. CONCLUSIONS AND RECOMMENDATIONS**

For the Eppleton Hall mooring and gangway, Thayer gangway and Alma gangway the single alternative presented above is recommended.

### **7.1 MAINTENANCE FLOAT**

One alternative was presented for access to the Maintenance Float. This approach, involving a ramp from the main pier down to a permanent landing at elevation +9.2 feet, a 60 foot long gangway, and a landing structure on the float deck is recommended. The cost of this alternative can be reduced if a small (relatively) barge can be salvaged and reused. There is a possibility that some small Navy barges, located in the Alameda Estuary adjacent to the former Naval Air Station, and could be obtained for a relatively low cost.

### **7.2 EUREKA GANGWAY**

Alternative one provides the simplest access for the public and is therefore recommended. Alternative 3 is the least costly, but requires a considerable landing structure system on the Eureka. This landing/ramp system would affect the visual appearance of the Eureka and make access on the main deck more cumbersome. Alternative 3 is not recommended because of the additional confusion to the public caused by using two gangways.

### **7.3 EPPLETON HALL**

Mooring the Eppleton Hall on the leeward side of the Eureka, and providing access from the Eureka is recommended. Of importance to the approach is the need to mooring the Eppleton Hall to the Eureka to limit differential movement. The mooring, both the dolphins and connection to the Eureka, will need to be studied in more detail during final design.

### **7.4 C.A. THAYER**

Replacing the turntable and gangway on the Thayer is recommended. This will help to ensure lower maintenance and ease of operation.

### **7.5 HERCULES RAMP**

Replacing the entire access system for the Hercules is recommended. This will involve a new platform on the access pier, a new gangway with turntable top support, and a new landing on the Hercules stern.

### **7.6 ALMA**

Reconstructing the present gangway support in the timber deck, and installing anew aluminum gangway is recommended.

## 7.7 BALCLUTHA GANGWAY

Alternative 1 is recommended. This alternative provides relatively easy access for the public with the lowest loading from the fenders on the hull structure.

Alternative 2, similar in concept to Alternative 1 would increase the mooring load on the hull. Alternative 3, in addition to the hull loading, is more confusing for general public access.

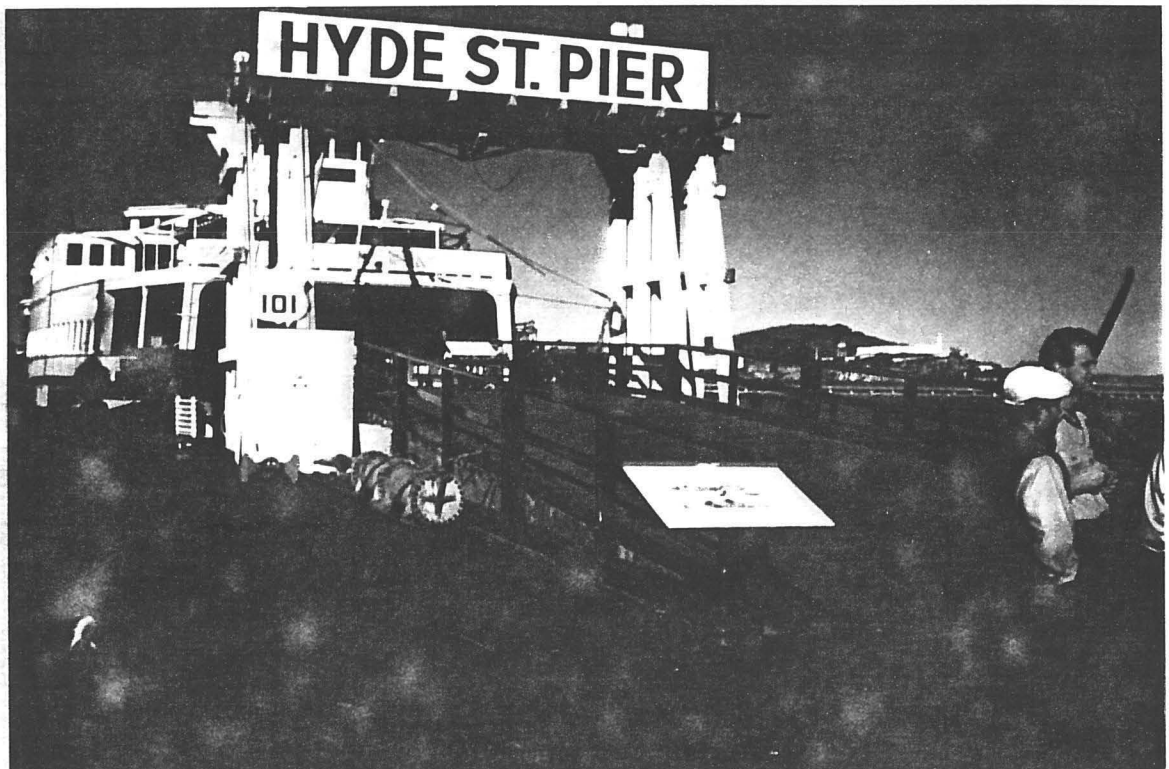
Alternative 2 is recommended.

FIGURE NO.	TITLE
1-1	VESSEL SITE PLAN
5-1	MAINTENANCE FLOAT-- ACCESS
5-2	EUREKA SINGLE GANGWAY--ALTERNATIVE 1
5-3	EUREKA DOUBLE GANGWAY--ALTERNATIVE 2
5-4	EUREKA DOUBLE GANGWAY--ALTERNATIVE 3
5-5	EPPLETON HALL--SITE PLAN
5-6	HERCULES ACCESS
5-7	BALCLUTHA FENDER PILE--ALTERNATIVE 1
5-8	BALCLUTHA DOLPHIN--ALTERNATIVE 2
5-9	BALCLUTHA DOUBLE GANGWAY--ALTERNATIVE 3

PHOTO NO.	TITLE
1	MAINTENANCE FLOAT AND GANGWAY
2	EUREKA ACCESS RAMP
3	EUREKA GANGWAY AT HIGH TIDE
4	EPPLETON HALL
5	C.S. THAYER GANGWAY
6	C.S. THAYER TURNTABLE
7	HERCULES ACCESS
8	HERCULES ACCESS PLATFORM AND BROW RAMP
9	BALCLUTHA GANGWAY BEARING PLATE
10	BALCLUTHA GANGWAY ROLLER ASSEMBLY
11	BALCLUTHA RAMP ON VESSEL
12	ALMA ACCESS VIA WHEAT FLOAT
13	WHEAT FLOAT GANGWAY CONNECTION TO MAIN PIER

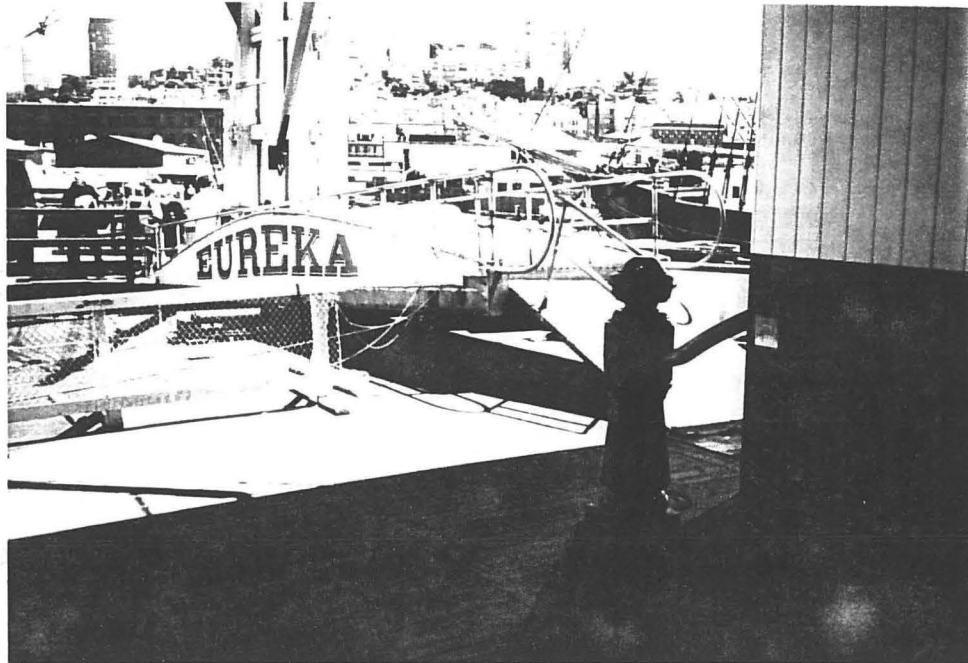


PHOTOGRAPH NO. 1  
MAINTENANCE FLOAT AND GANGWAY

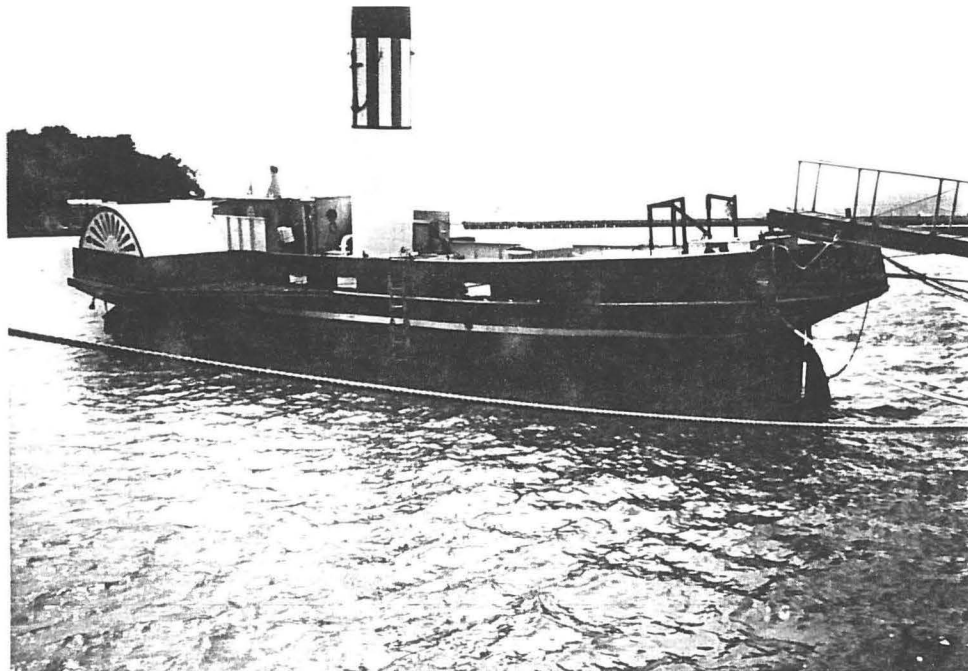


PHOTOGRAPH NO. 2  
EUREKA ACCESS RAMP

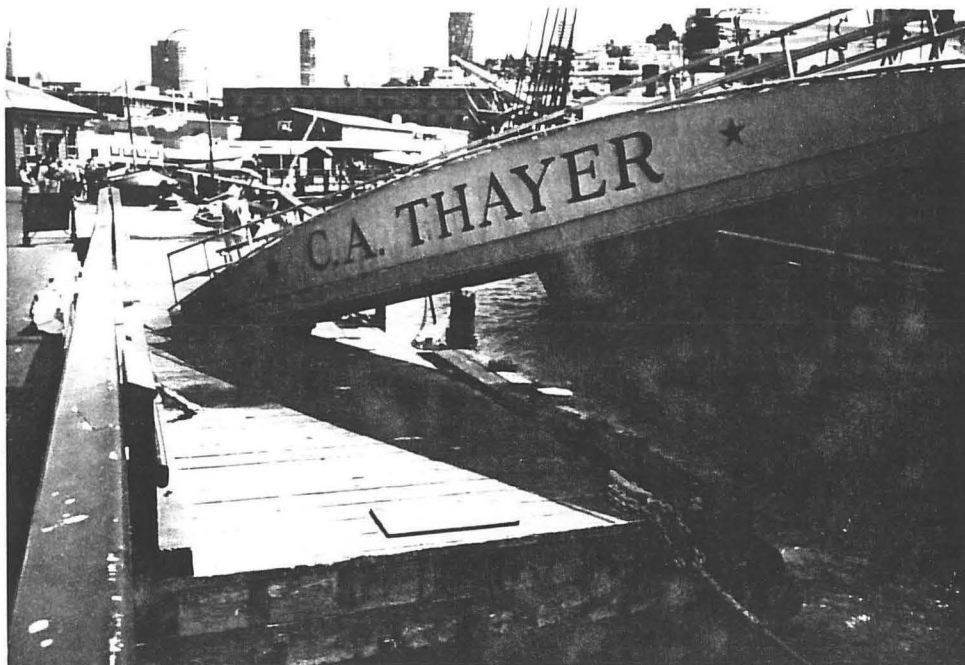




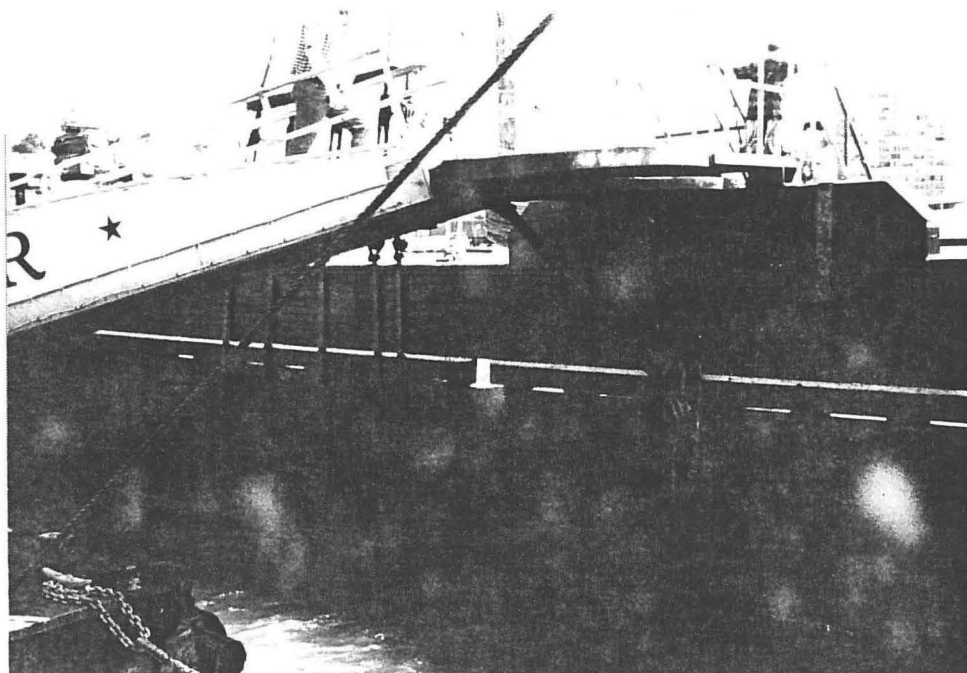
PHOTOGRAPH NO. 3  
EUREKA GANGWAY AT HIGH TIDE



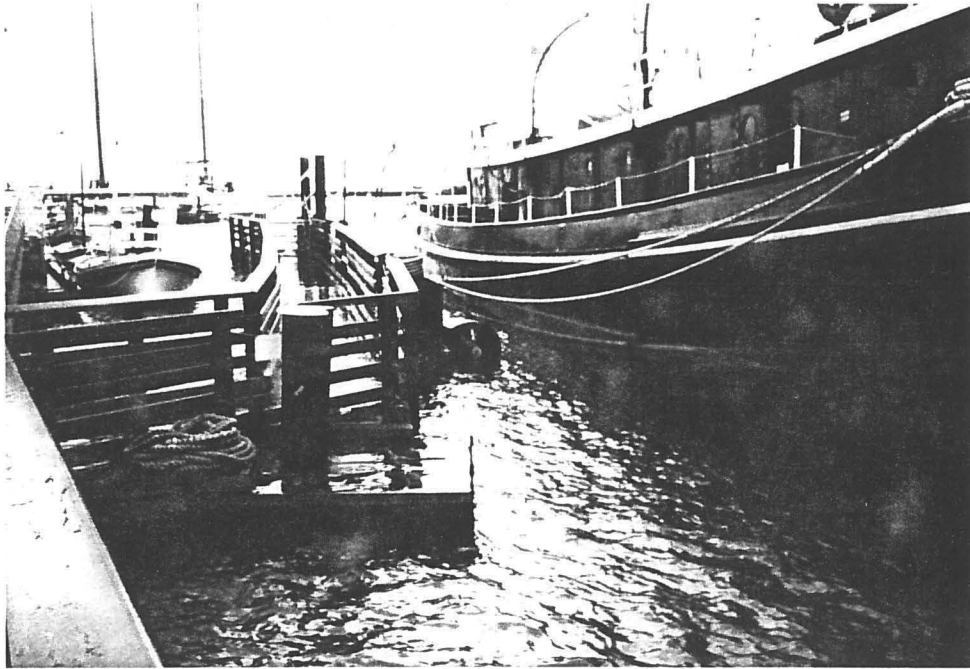
PHOTOGRAPH NO. 4  
EPPLETON HALL (GANGWAY NOT FOR PUBLIC ACCESS)



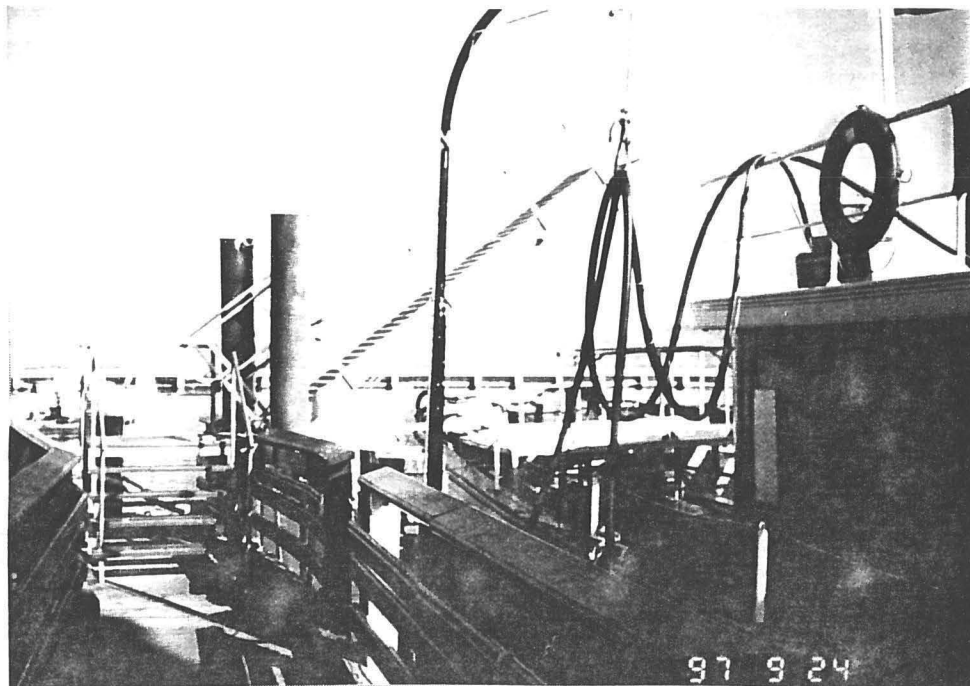
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C.S. THAYER GANGWAY



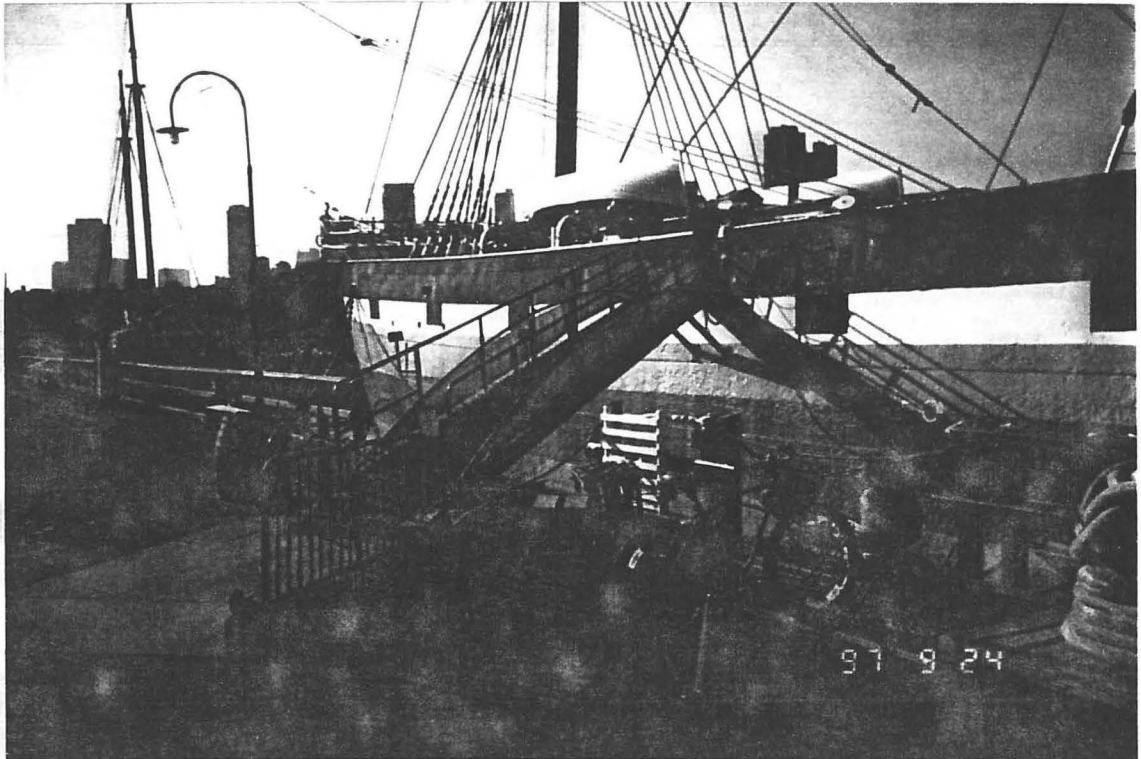
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C.S. THAYER TURNTABLE



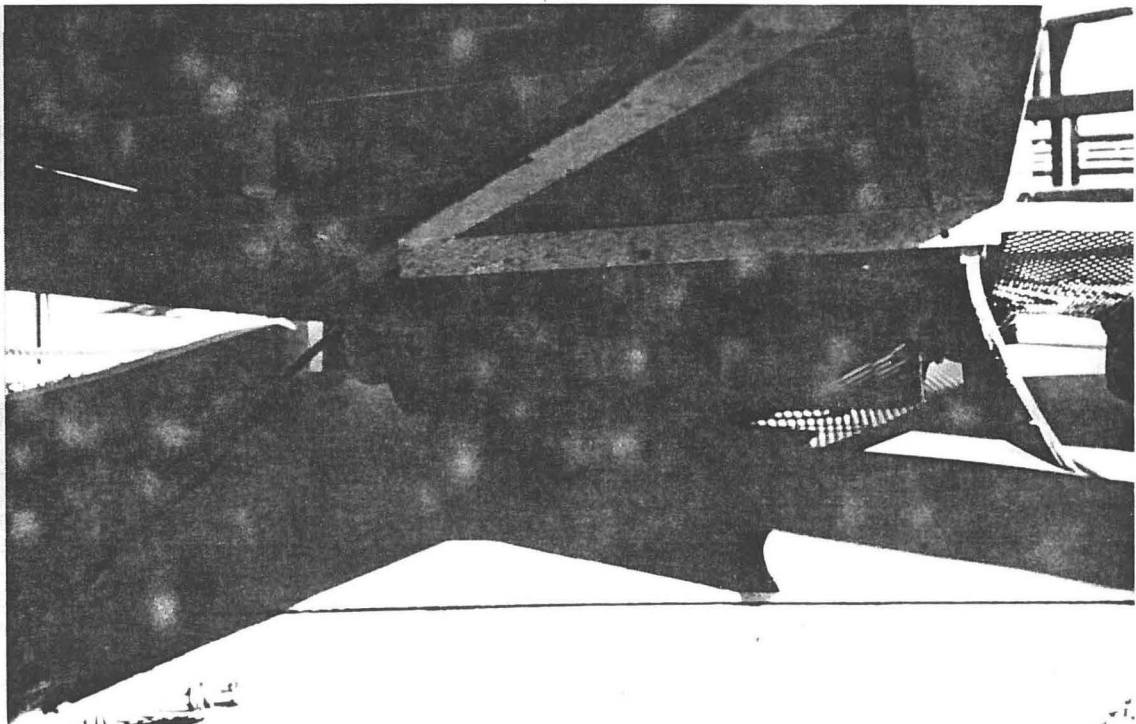
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HERCULES ACCESS



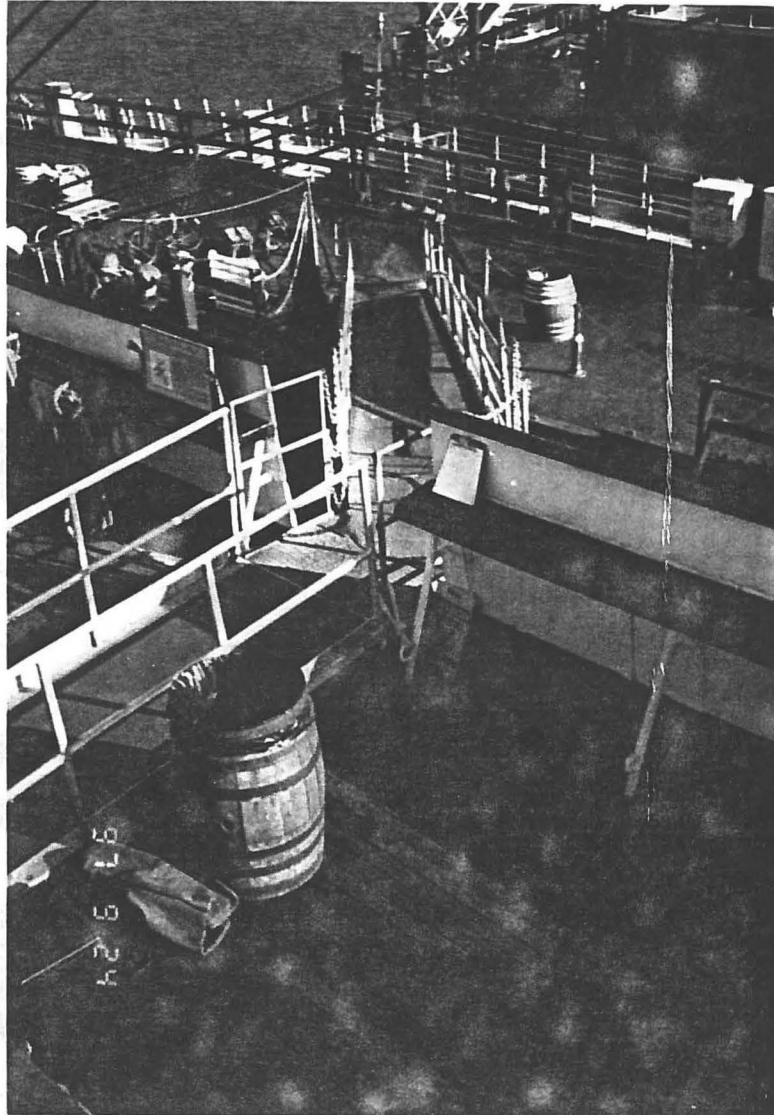
PHOTOGRAPH NO. 8  
HERCULES ACCESS PLATFORM AND BROW RAMP



PHOTOGRAPH NO. 9  
BALCLUTHA GANGWAY BEARING PLATE

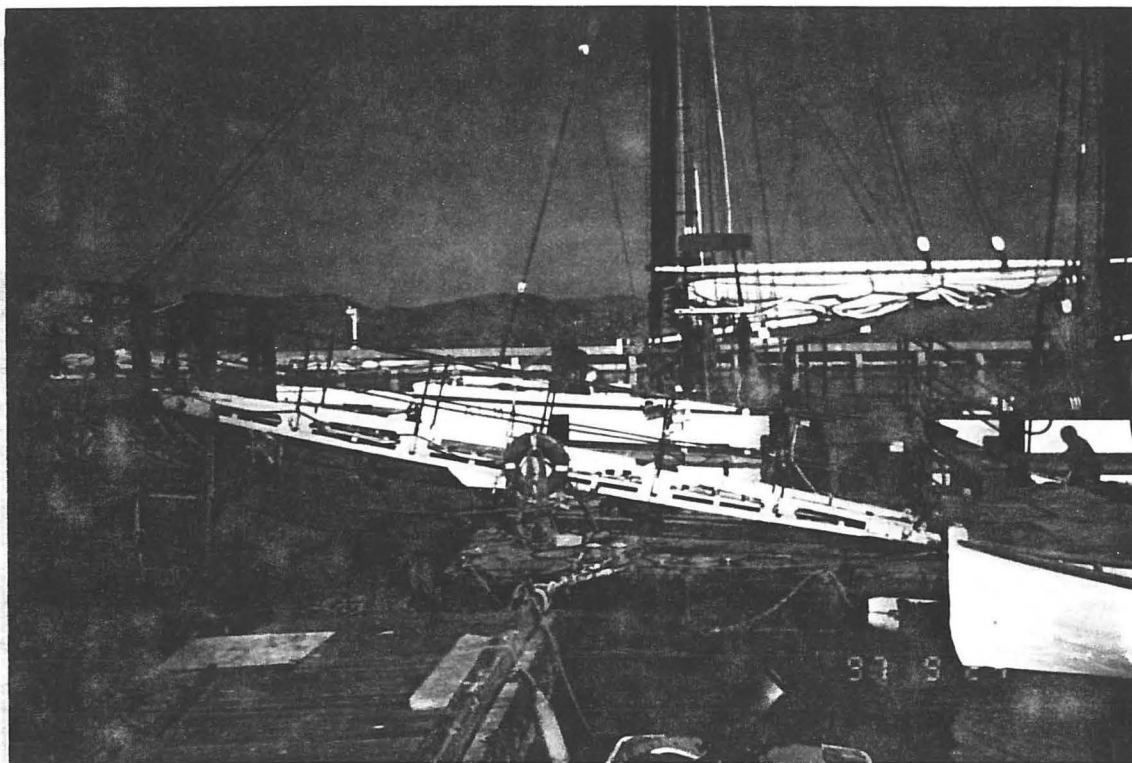


PHOTOGRAPH NO. 10  
BALCLUTHA GANGWAY ROLLER ASSEMBLY

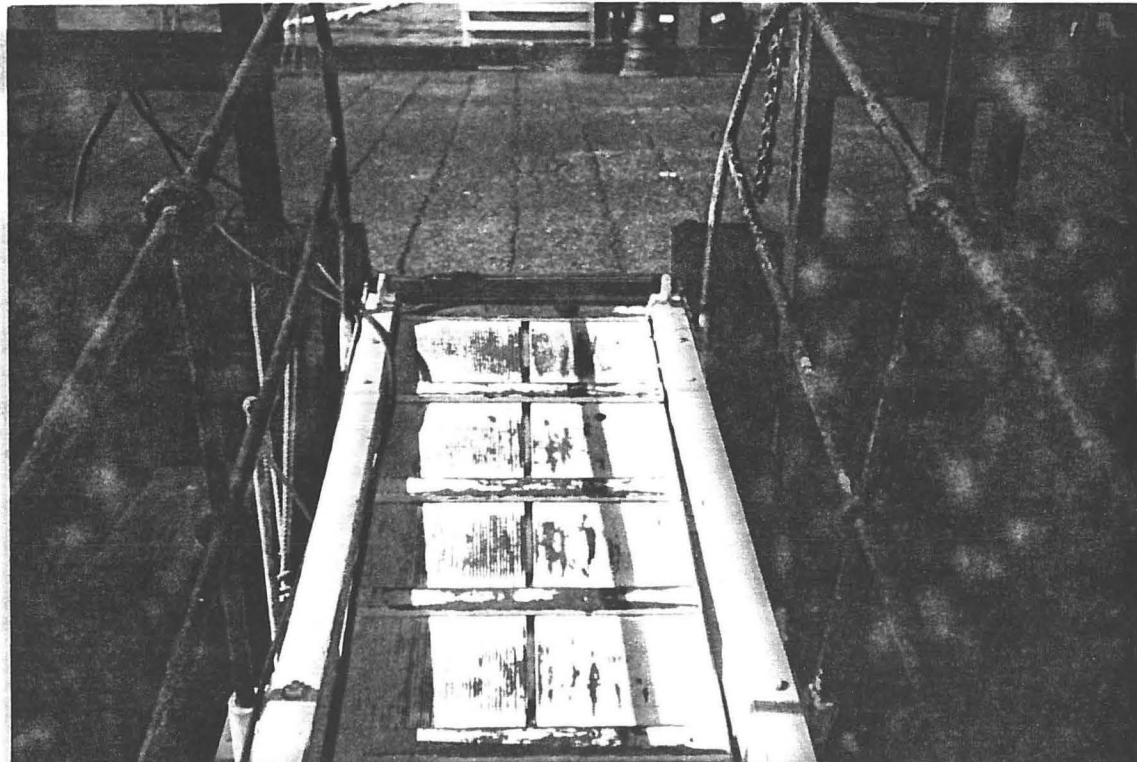


PHOTOGRAPH NO. 11  
BALCLUTHA RAMP ON VESSEL





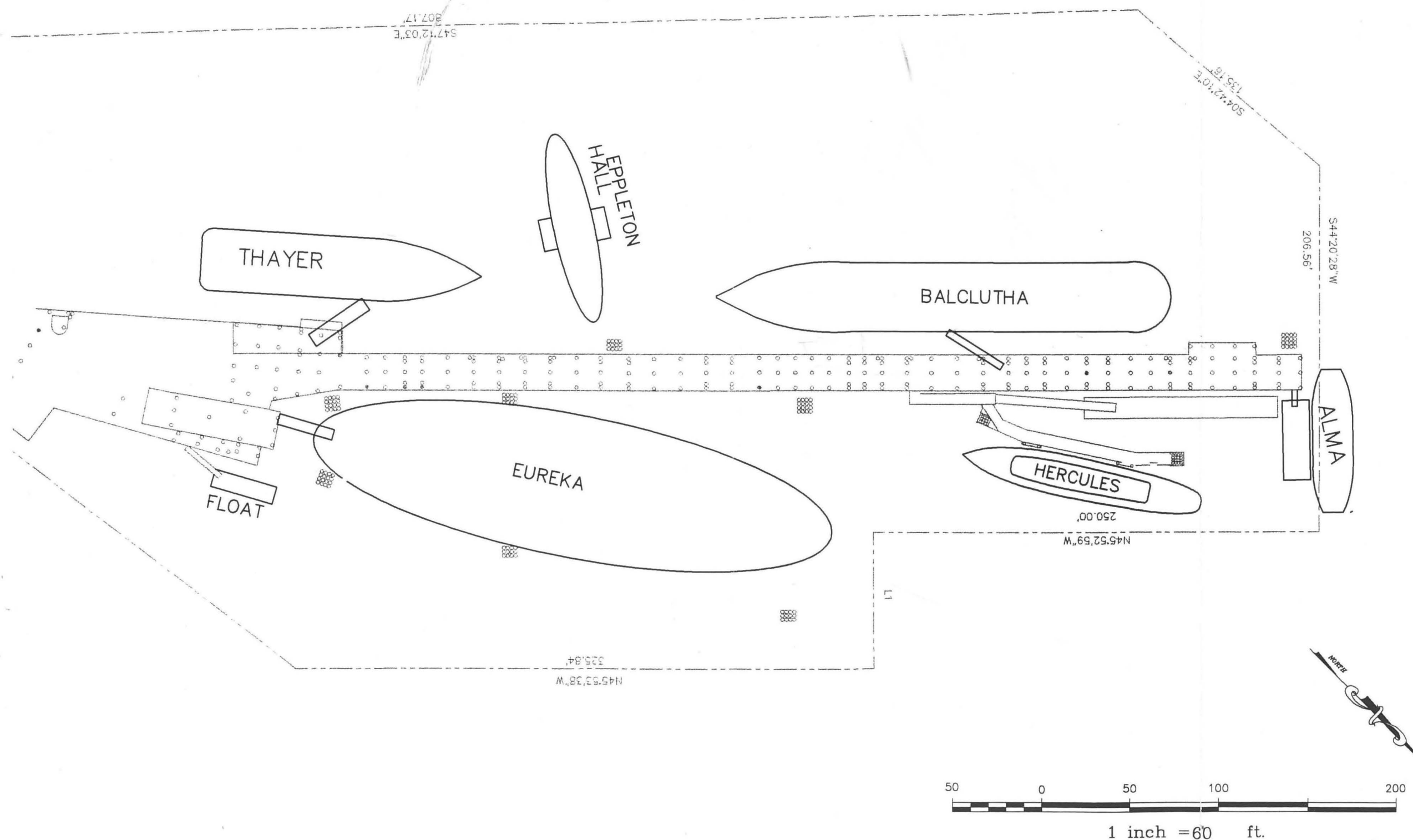
PHOTOGRAPH NO. 12  
ALMA ACCESS VIA WHEAT FLOAT



PHOTOGRAPH NO. 13  
WHEAT FLOAT GANGWAY AT MAIN PIER

J. Porter Shaw Library  
San Francisco Maritime  
NHP



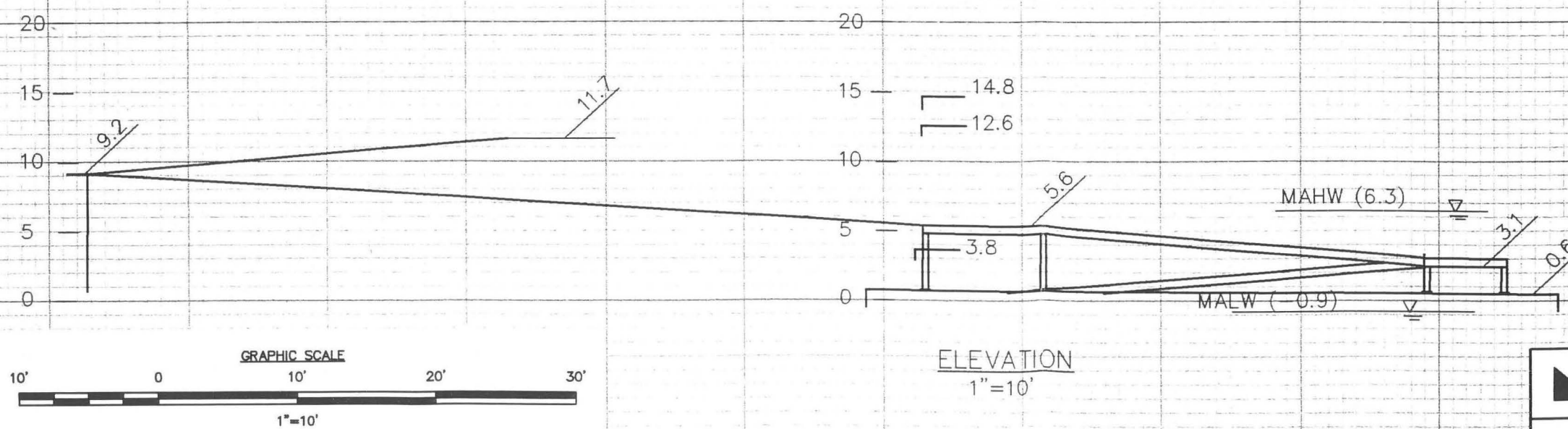
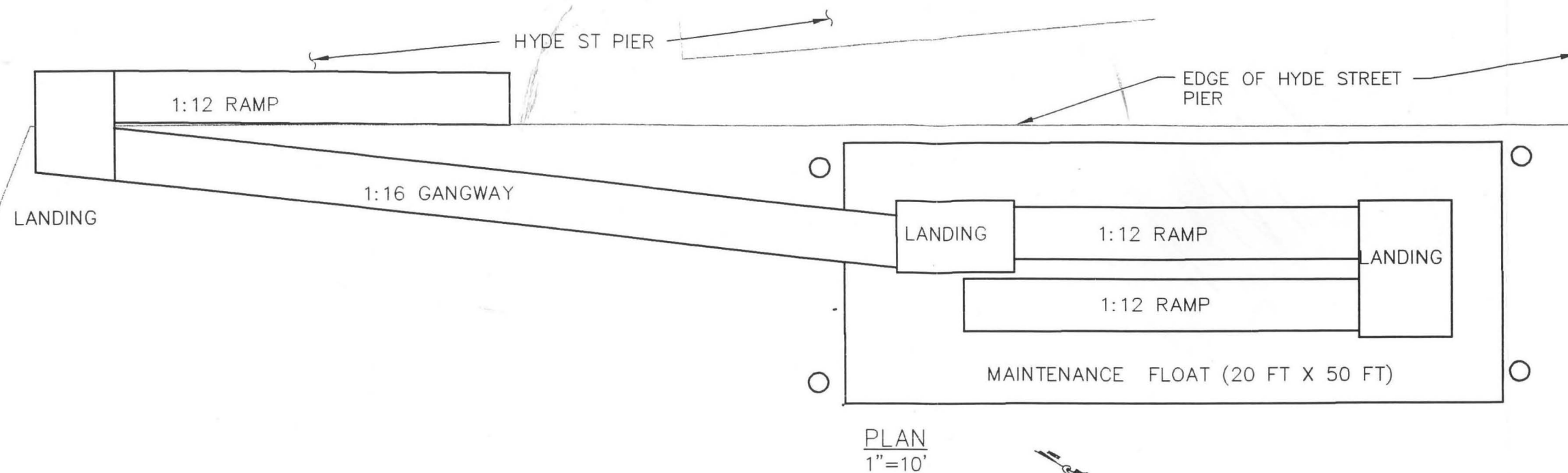




**MOFFATT & NICHOL**  
 ENGINEERS

WALNUT CREEK, CALIFORNIA

HYDE STREET PIER  
 ACCESS STUDY  
 FIGURE 1.1 VESSEL SITE PLAN

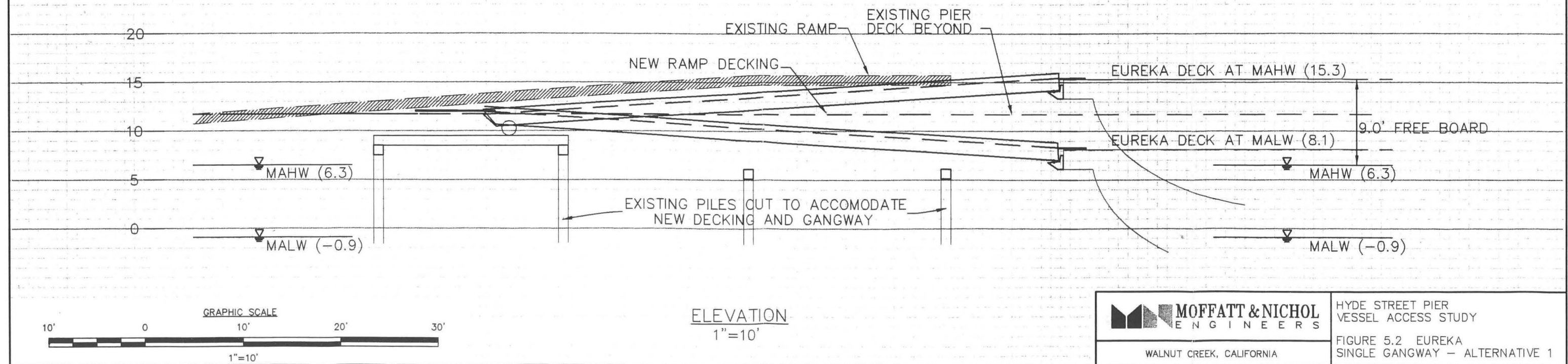
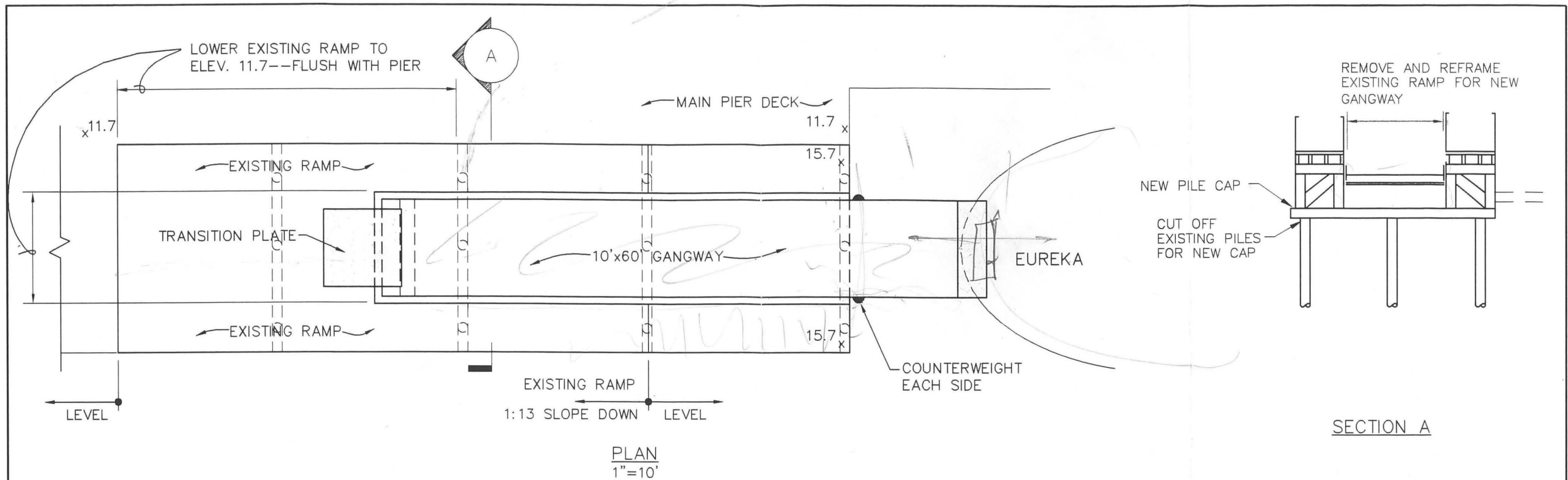


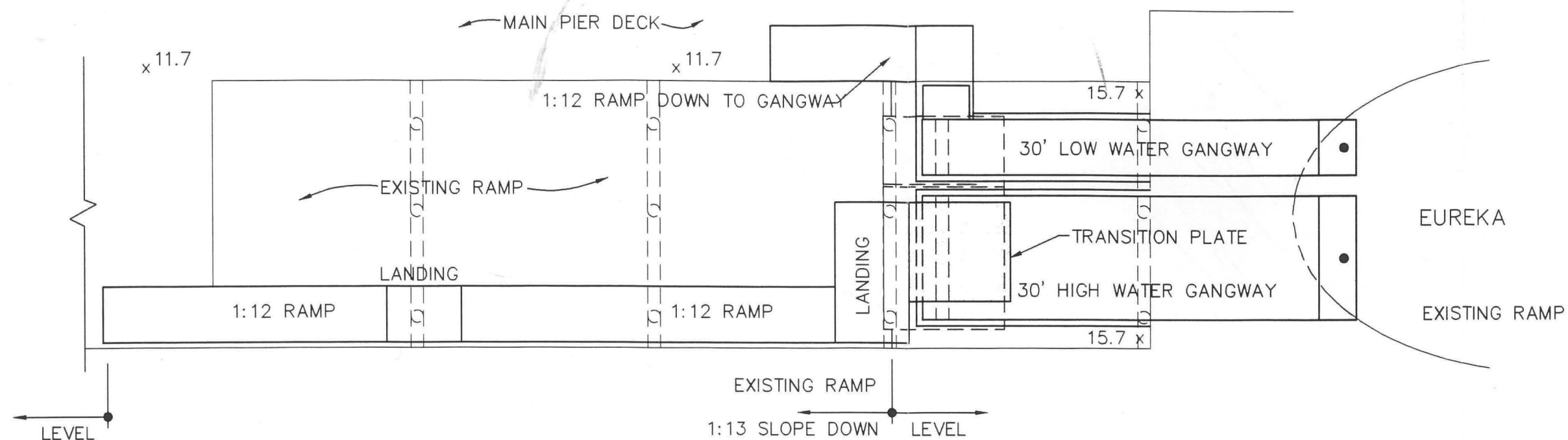
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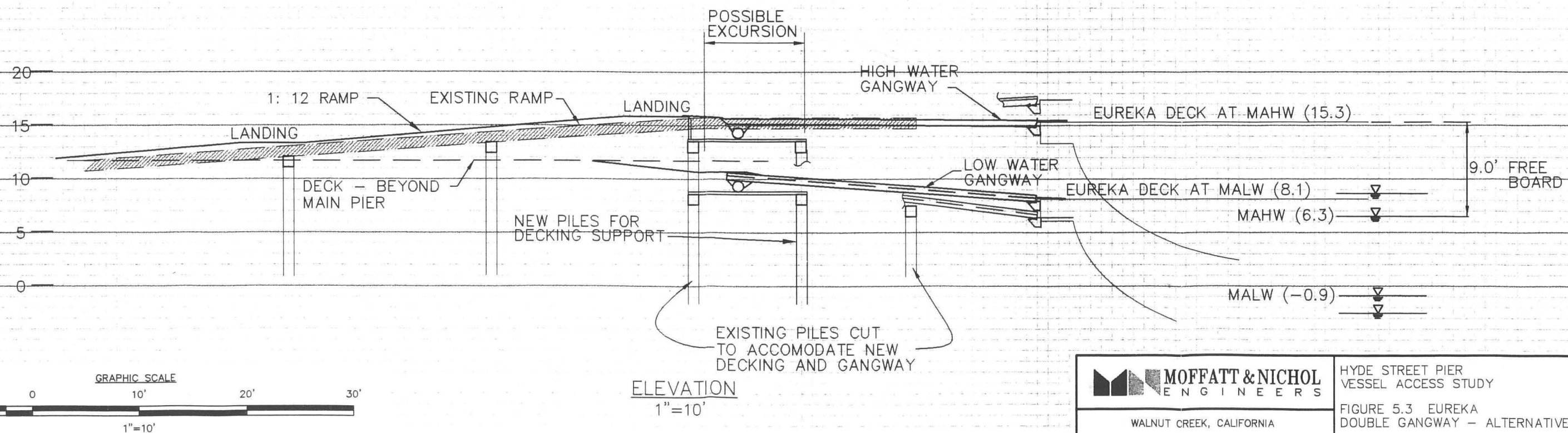
HYDE STREET PIER  
ACCESS STUDY

FIGURE 5.1  
MAINTENANCE FLOAT--ADA ACCESS





- NOTES:
1. LOW WATER GANGWAY IS HANDICAP ACCESSIBLE BETWEEN THE -0.9 AND 4.1 TIDES.
  2. HIGH WATER GANGWAY IS HANDICAP ACCESSIBLE BETWEEN THE 4.1 AND 6.3 TIDES.
  3. HIGH WATER GANGWAY WILL BE USED FOR HISTORIC VEHICLE LOADING AND UNLOADING.



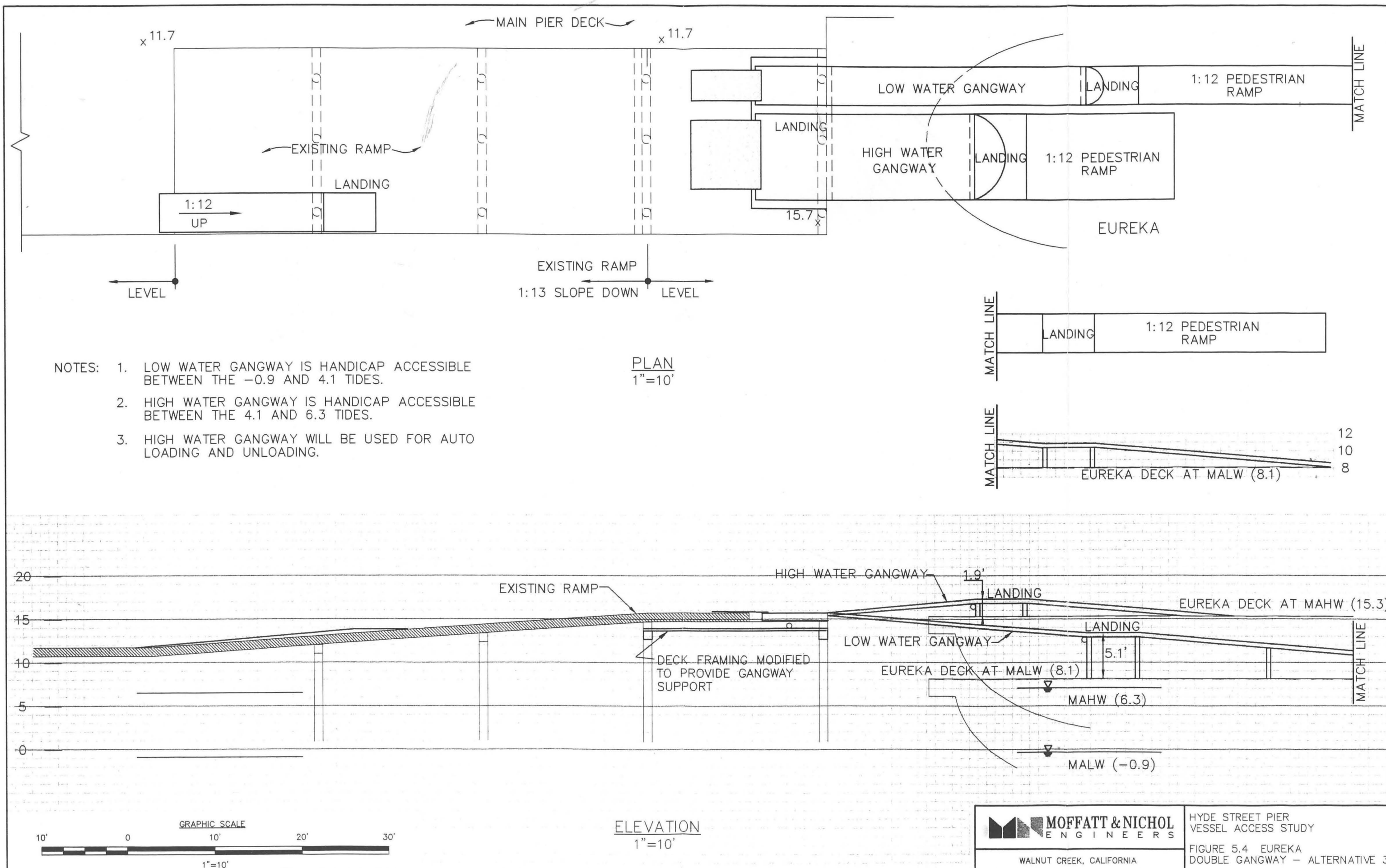
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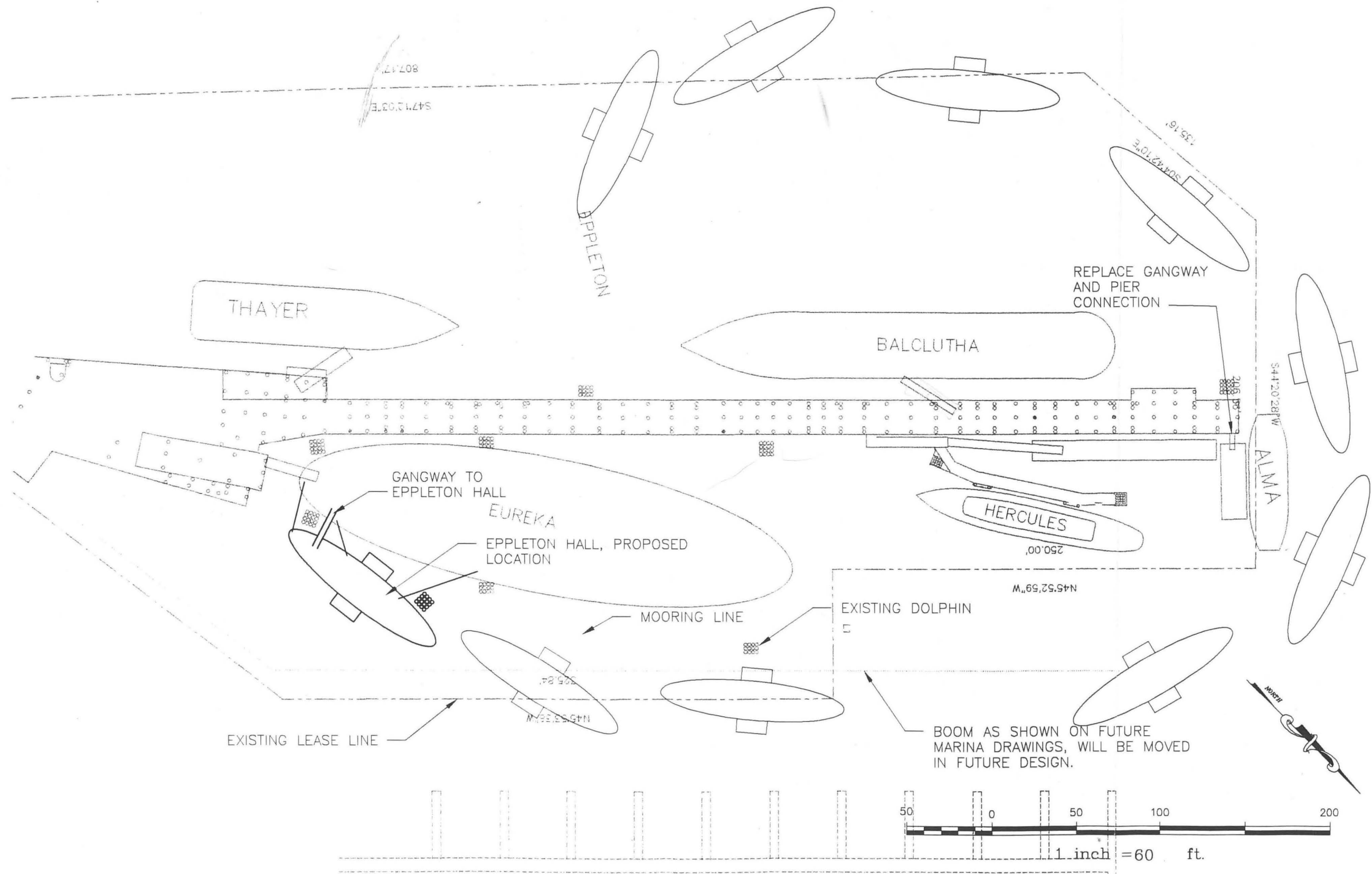
WALNUT CREEK, CALIFORNIA

HYDE STREET PIER  
VESSEL ACCESS STUDY

FIGURE 5.3 EUREKA  
DOUBLE GANGWAY - ALTERNATIVE 2







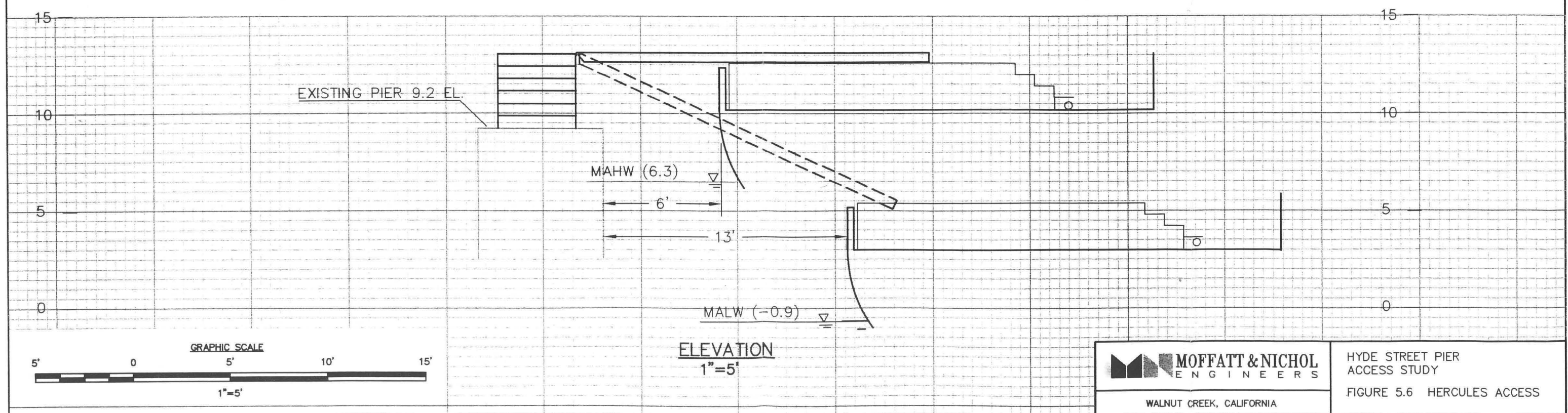
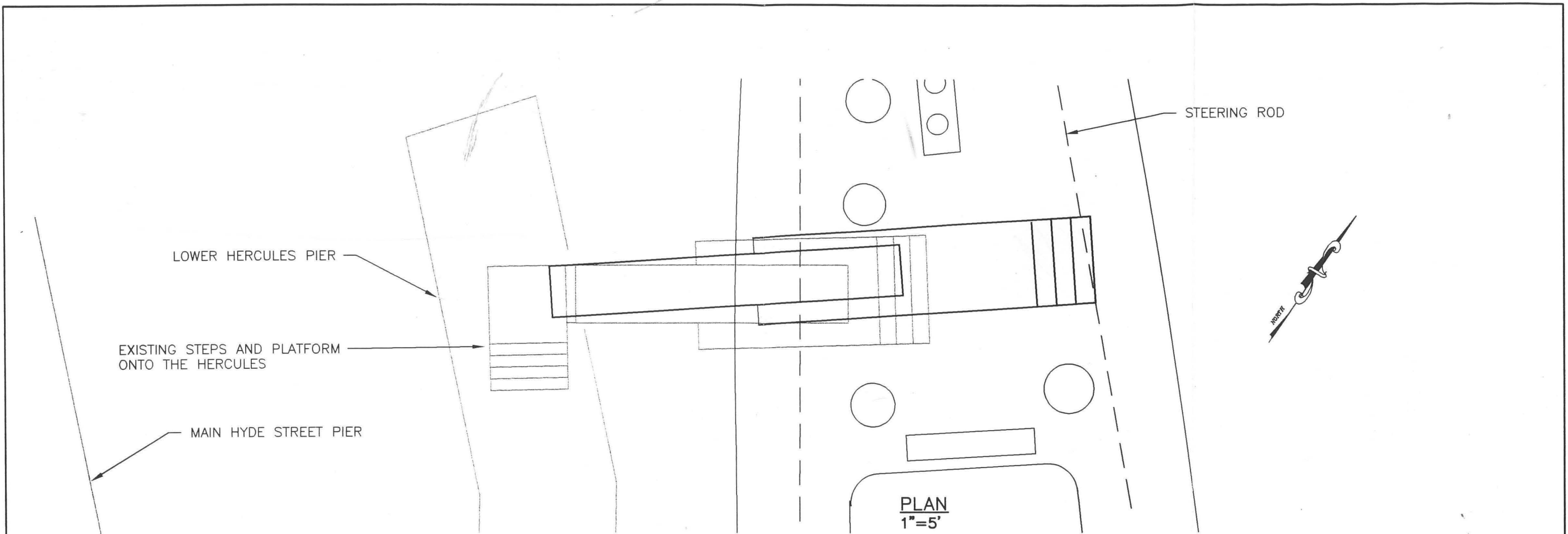
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HYDE STREET PIER  
ACCESS STUDY

FIGURE 5.5  
EPPLETON HALL--SITE PLAN

J: \4063\DWG\SITE.DWG

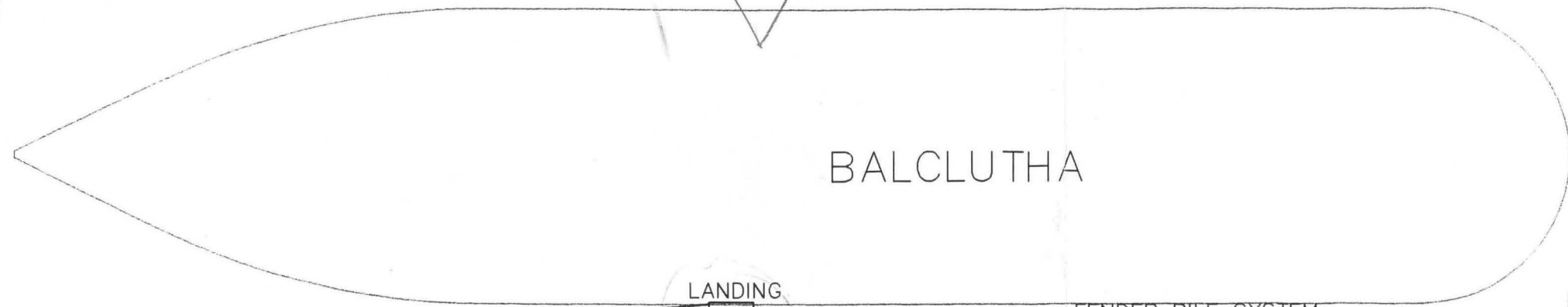




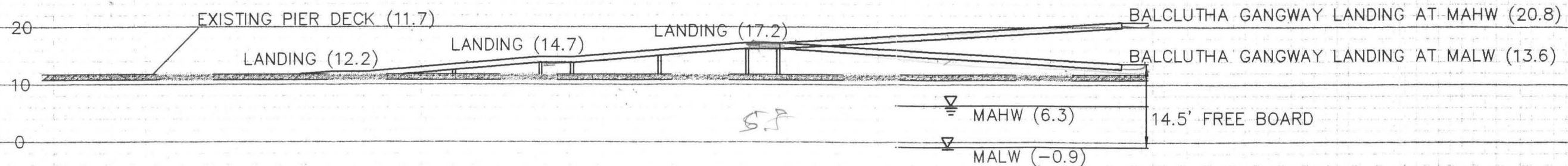
OK

4 inch

existing dots / 55371  
not wopim

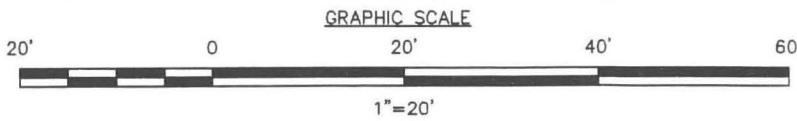


PLAN  
1"=20'



ELEVATION  
1"=20'

NOTE: ALL RAMPS HAVE 1:12 GRADE.

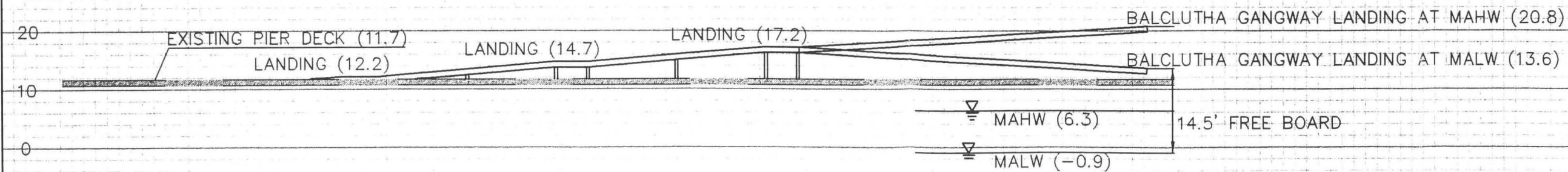
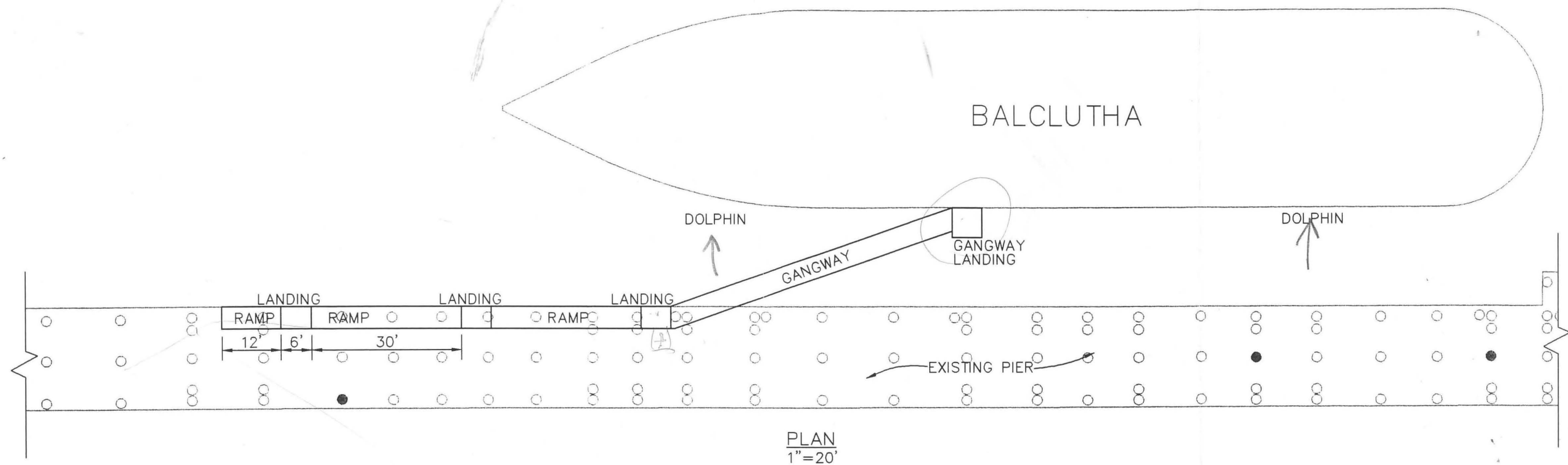


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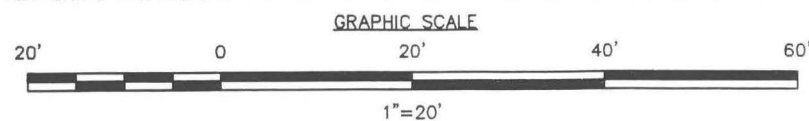
WALNUT CREEK, CALIFORNIA

HYDE STREET PIER  
VESSEL ACCESS STUDY

FIGURE 5.7 BALCLUTHA  
FENDER PILE - ALTERNATIVE 1



NOTE: ALL RAMPS HAVE 1:12 GRADE.

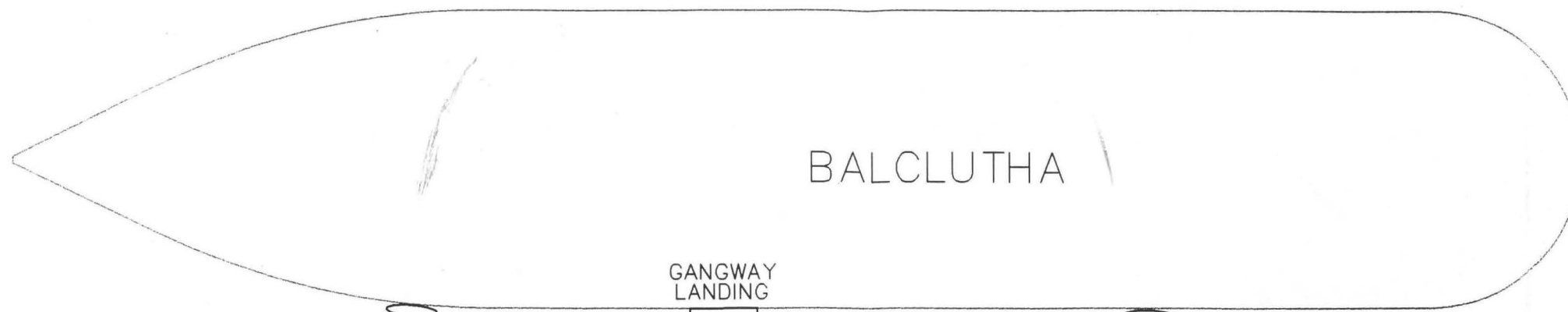


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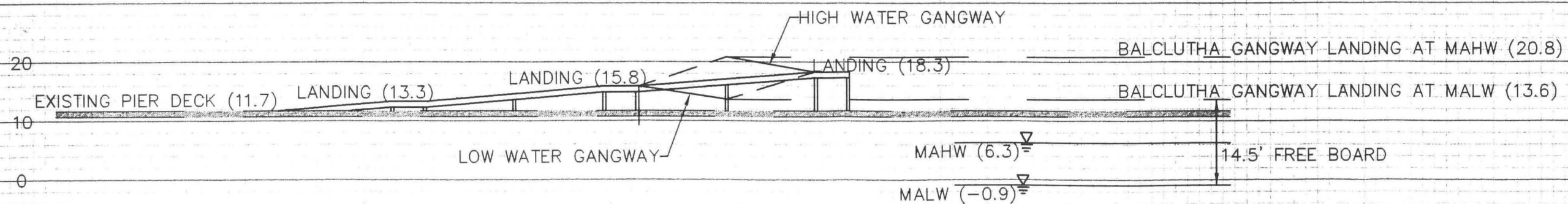
HYDE STREET PIER  
VESSEL ACCESS STUDY

FIGURE 5.8 BALCLUTHA  
DOLPHIN — ALTERNATIVE 2

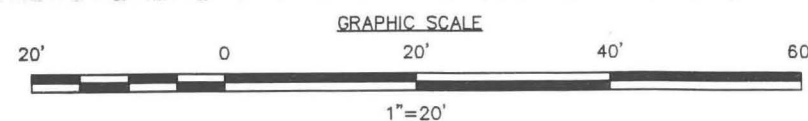


- NOTES:
1. ALL RAMPS HAVE 1:12 GRADE.
  2. LOW WATER GANGWAY IS HANDICAP ACCESSIBLE BETWEEN THE -0.9 AND 4.1 TIDES.
  3. HIGH WATER GANGWAY IS HANDICAP ACCESSIBLE BETWEEN THE 4.1 AND 6.3 TIDES.

PLAN  
1"=20'



ELEVATION  
1"=20'



WALNUT CREEK, CALIFORNIA

HYDE STREET PIER  
VESSEL ACCESS STUDY

FIGURE 5.9 BALCLUTHA  
DOUBLE GANGWAY - ALTERNATIVE 3